**Basis Statement**
**State Implementation Plan for Regional Haze**

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**EPA**

1) Page 74 -In Section 8.2.2. Maine describes the "Emission control strategies" used to generate Future Year Emission Control Inventories. The MACTEC report (Attachment I) documents the development of the on-the books/on-the-way (OTB/OTW) and beyond-on-the-way (BOTW) inventories. However, there is no specific documentation as to how the "final modeling inventory" was developed. Therefore, Maine's Regional Haze SIP submittal should also include the documentation for the "final modeling inventory." (1)

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*The final modeling inventory was developed after MANE-VU selected a number of control measures on which to base the modeling that would ultimately be used to develop proposed reasonable progress goals. Also known as the MANE-VU Ask, these measures include additional targeted $SO_2$ emission reductions at electric generating units (EGUs), the use of low-sulfur fuels in the MANE-VU region, and reductions in non- EGU $SO_2$ emissions outside of MANE-VU. The final modeling inventory also included emission reductions attributable to the implementation of BART and anticipated changes in Canadian emission reductions. The NESCAUM report "2018 Visibility Projections" (Attachment Q) provides a detailed discussion on the development of the final modeling inventory. Additional information on the preparation of the EGU emissions inventory is provided in the Alpine Geophysics report "Documentation of 2018 Emissions from Electric Generation Units" (Attachment S).*

2) Page 186 -Maine's Regional Haze SIP includes a demonstration that Maine is achieving its share of emission reductions for the first planning period. This demonstration includes a revised projected 2018 inventory. This inventory was based on plant closures since the 2002 base year and the impact of the 0.5% sulfur limit on point source emissions. When developing this projection, Maine used the 2008 inventory and applied a growth factor of 1 to project the 2018 inventory for these point sources. Maine's demonstration should include a brief discussion of the basis of its decision to use a growth factor of 1. (1)

*The Department has amended its proposal to include a discussion of its choice to utilize a unitary growth factor.*

3) Page 128 -As stated in 40 CFR Section 51.308(e)(1)(v), the Regional Haze SIP must include a requirement that each BART source maintain the control equipment and establish procedures to ensure such equipment is properly operated and maintained. According to Maine, this requirement will be included in the Title V operating permits for each source subject to BART and made federally enforceable through incorporation in the Maine Regional Haze SIP. These permits were not, however, included in the current draft. (1)

*The Department has amended its proposal to explicitly include the requirement that each BART source maintain the control equipment and establish procedures to ensure such equipment is properly operated and maintained pursuant to 40 CFR Section 51.208(e)(1)(v). Although the Department initially proposed including each Title V operating permit as an attachment to the Maine Regional Haze SIP, doing so would significantly complicate the Department's Title V licensing program. Incorporating the Title V licenses, which are already federally enforceable, in the Regional Haze SIP would make each and every element of the licenses federally enforceable under Title I of the 1990 Clean Air Act (CAA). As a result, any changes to these licenses, no matter how minimal, would need to be treated as SIP revisions pursuant to Title I, and require formal public notice and comment pursuant to Section 110 of the CAA.*

4) Page 106 -When undertaking the five factor BART analysis, Dragon Products used a

potential $SO_2$ Emission Rate of 49.0 tons/yr. Based on this emission limit, Dragon Products determined that it was not cost effective to operate the existing dry scrubber ($2,254,468/deciview). However, the proposed BART license limit for $SO_2$emissions from the kiln system is 200 tons/yr on a 12 month rolling total basis. It is not clear why the proposed cap is so much higher than the level in the facility's analysis. (1)

*The Dragon Products BART analysis used a potential emission rate of 49.0 tons per year because the facility has historically operated well below its maximum capacity. In reality, 49.0 tons per year represents actual, not potential, $SO_2$ emissions from the facility. Despite this, the Department agrees with results of the Dragon $SO_2$ BART analysis, namely that operation of the existing dry scrubber is not cost-effective at the current (and historical levels of operation). Although $SO_2$ emissions from the facility have historically been well below the 200 ton/yr potential, in an effort to provide operational flexibility, the Department is reluctant to impose further limits at this point in time.*[1]

5) Page 108 -Maine DEP has indicated that $NO_x$ BART control for the Dragon Products kiln is 45% control efficiency on a 24-hour basis as opposed to the current recorded 18 - 22 % average control efficiency. However, Maine is proposing that the current 90-day rolling average emission limit and existing 12-month rolling average emission limit are sufficient for the BART emission limit. Why isn't the emission limit being reduced to reflect the required increase in control efficiency? (1)

*The Department did not establish a more stringent short-term (24-hour) emission limit because there is not enough emission (stack) testing information available to develop hourly (or 24-hour) mass-based emission limits at this point in time. The Department is committing to establish short-term emission limits no later than January 1, 2013 as part of its 5-year periodic implementation plan revision.*

6) Draft license –The Dragon Products license includes a provision stating. "Compliance with the 45% control efficiency shall be determined on a 24 hour basis using CEM data and/or other methods approved by the Department." EPA does not allow for Director discretion in State Implementation Plans. The underlined phrase should be deleted and replaced with the appropriate EPA Reference Test Methods. (1)

*The Department has made the suggested change.*

[1] On October 1, 2010, and on November 8, 2010, Dragon Products, LLC submitted documentation asserting that the facility (kiln) qualifies as a reconstructed source (See Attachment M-2). The Department is therefore deferring the BART applicability determination for this source to U.S.EPA. The discussion regarding the Dragon Products BART determination in this Basis Statement and elsewhere in the Maine Regional Haze SIP represents the Department's draft BART determination prior to the submission of this documentation. In the event that U.S. EPA finds that Dragon Products, LLC is, in fact, BART eligible, the Department is committing to issue a final BART order within 60 days of said finding.

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7) Page 109 -Maine is proposing 1 % sulfur oil as BART for Boiler #3 at FPL Energy Wyman, LLC. The visibility cost effectiveness table, however, indicates that it is more cost effective to switch to the 0.7% sulfur oil than to the 1.0% sulfur oil ($0.56 million/dv and $0.69 million/ldv, respectively). In addition, Boiler #4 is already required to burn 0.7% sulfur oil. Furthermore, the MANE-VU recommended limit for EGUs is 0.3% sulfur fuel oil. Maine should better justify why 1 % sulfur oil is considered BART for Boiler #3. (1)

*The Department has amended the BART determination for Boiler# 3 at FPL Energy Wyman, LLC to require the use of 0.7% sulfur oil.*

8) In its discussion of the SD Warren Company BART analysis on page 115, Maine states, "Since no combustion takes place within smelt *tanks,* $SO_2$ is not generated within the emission unit. SDW was not able to identify any retrofit control technologies applicable to the control of $SO_2$ emissions from the smelt tank." This statement does not seem accurate, since the analysis of the Verso Androscoggin smelt tanks shows that the scrubbers utilized for PM control have a side benefit of reducing $SO_2$ emissions. The SD Warren BART analysis should include a discussion of the benefit of the existing scrubber, in addition to the low overall $SO_2$ emissions and minimal visibility impact of the smelt tanks. (1)

*The Department has amended the Maine Regional Haze SIP to include a discussion of the co-benefits provided by the existing scrubber at the SAPPI (S.D. Warren) facility.*

9) Page 136 -Included in the list of BART units in Table 11-5 is SAPPI (SD Warren) Power Boiler 1. Table 11-5 indicates that the $SO_2$ emissions for this unit will be reduced from 2884 tons in 2002 to 1442 tons in 2018. However, a discussion of the BART determination for this source, or a discussion of the manner in which these emission reductions are to be achieved, is not included. (1)

*Although the No. 1 Power Boiler was initially thought to meet the definition of a "BART-eligible source", it has since been demonstrated that Power Boiler #1 does not meet the any of the potential applicability categories under 40 CFR Part 51.300.*

*The No.1 Power Boiler has been limited to firing less than 250 million BTU/ hr of oil by State and Federally enforceable operational limits since 1976. In 2004, U.S. EPA issued an Administrative Order requiring S.D. Warren to permanently reduce the capacity of the No. 1 Power Boiler to fire less than 250 MMBtu/hr of oil.*

*Reviewing the criteria for defining a BART-eligible source (40 CFR Section 52.301), a BART-eligible source is defined to include the following categories that might potentially apply to the No.1 Power Boiler:*

> *1) Fossil-Fuel Fired Steam Electric Plants of More than 250 MMBtu/hr Heat Input;*

*2) Kraft Pulp Mills; and*

*3) Fossil-Fuel Boilers of More than 250 MMBtu/hr Heat Input.*

*Looking at each of these categories, we see that the No. 1 Power Boiler is not covered by the "Fossil-Fuel Fired Steam Electric Plants of More than 250 MMBtu/hr Heat Input" category because (in accordance with EPA guidance), units constructed prior to 1990 that supply less than one-third of their potential electrical output capacity, or less than 219,000 MWe-hrs on an annual basis to a utility power distribution system for sale are exempt (the No. 1 Power Boiler has not supplied more than one-third of its potential electrical output capacity nor more than 219,000 MW/yr to a utility distribution system for sale on an annual basis).*

*The No. 1 Power Boiler does not qualify as a "Kraft Pulp Mill" because, pursuant to 40 CFR Part 51, Appendix Y, a boiler less than 250 MMBtu/hr input that is not an integral part of a process description at a plant that is in a different BART category (Kraft Pulp Mill in this case) is not subject to BART. Since the No.1 Power Boiler produces only steam, and is not integral to the pulp or paper making process, it is not subject to BART as a Kraft pulp Mill.*

*Finally, since the No. 1 Power Boiler has had state and federally enforceable operational limits that restrict the use of oil to less than 250 MMBtu/hr since 1976, and had actual physical limitations further limiting the capacity of the unit to fire oil at less than 250 MMBtu/hr installed in 2004, the unit is not subject to BART as a "Fossil-Fuel Boiler of More than 250 MMBtu/hr Heat Input".*

*It is important to note that although the No. 1 Power Boiler is no longer a BART-eligible source, its projected 2018 emissions of 1442 tons per year is nevertheless accurate. The S.D. Warren facility has implemented operational changes to the No.1 Power Boiler that will reduce its $SO_2$ emissions by 50% from the 2002 baseline of 2884 tons, with these changes federally enforceable under its Title V operating permit.[2] Since these $SO_2$ emission reductions will be occurring (albeit not under the BART program), it is not necessary to adjust the reasonable progress modeling. The Department has added a note to Table 11-5 and Table 12-1 indicating that these reductions are no longer due to BART, but instead other programs.*

10) Page 120 -Maine is proposing 0.7% sulfur in fuel oil as BART at the Verso Androscoggin mill. The cost effectiveness of this option was estimated at $631 per ton $S0_2$ reduced. The MANE-VU recommended limit for these units, however, is 0.5% sulfur oil. There is no analysis or discussion in the draft as to whether this option was considered. (1)

*Verso Androscoggin, LLC did not consider the use of 0.5% sulfur or lower fuel oil in its*

[2] As part of its best practical treatment (BPT) requirements, in 2004 the Department required the installation of a white liquor scrubber on odiferous gases that allows these gases to be combusted in either the No. 1 Power Boiler or in the Lime Kiln. The white liquor scrubber provides a 50% reduction in $SO_2$ emissions.

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*BART analysis because the Department's ability to require the use of these fuels is limited by 38 M.R.S.A. §603-A, sub-§8 which states:*

> *"8. Best available retrofit technology or BART requirements. For those BART eligible units determined by the department to need additional sulfur air pollution controls to improve visibility, the controls must:*
>
> *A. Be installed and operational no later than January 1, 2013; and*
>
> *B. Either:*
>
> *(1) Require the use of sulfur oil having 1% or less of sulfur by weight; or*
>
> *(2) Be equivalent to a 50% reduction in sulfur emissions from a BART eligible unit based on a BART eligible unit source emission baseline determined by the department under 40 Code of Federal Regulations, Section 51.308 (d)(3)(iii)(2006) and 40 Code of Federal Regulations, Section 51 Attachment Y (2006)."*

*Since Power Boilers # 1 and #2 at the facility currently fire 1.8% sulfur fuel oil, 0.7% sulfur fuel was chosen as BART, for it is a widely available fuel that satisfies not just one, but both, of the statutory criteria. Although 0.5% sulfur fuel oil would also satisfy both of these criteria, the Department's ability to require its consideration is limited by the above statute.*[3]

*It should also be noted that this source, along with all other users of residual oil will be subject to a 0.5% sulfur limit (or equivalent control) beginning January 1, 2018. Additional discussion regarding the interplay between BART and the Maine Low Sulfur Fuel Program is provided in Section 10-3 of the Maine Regional Haze SIP and in Comments #25 and 27, below.*

11) Page 121 -Although the expected visibility improvements from installing SCR is 1.7 dv, this control is not proposed to be BART based on the limited use of Power Boilers 1 and 2. The limited use must be made enforceable to be considered in the BART determination. (1)

*The Department disagrees with the Commenters' position that the limited use of Power Boilers 1 and 2 must be made enforceable to be considered in the BART determination. As the commenter knows, the BART determination includes a determination of the cost of compliance, which is, in turn, dependent upon a number of operational parameters. For Verso Paper, operational flexibility in generating power and steam is important to both supply reliability, and cost-competitiveness. Verso Paper's main steam header is supplied by two oil-fired boilers, a multi-fuel boiler, two recovery boilers, and three*

[3] Recognizing that EPA can independently impose more stringent emission limitations, regardless of State law, some Maine BART sources chose to voluntarily consider and accept more stringent limits than required by statute (e.g., FPL Wyman, LLC Unit #3).

*combustion turbines which fire primarily natural gas. Steam is typically supplied by either the power boilers or the combustion turbines. When the combustion turbines are used, this cogeneration system supplants the operation of the No. 1 and 2 Power Boilers as the principal source of steam, reducing the use of the power boilers and substantially reducing emissions. Together, the No. 1 and No.2 Power Boilers had only 3,921 operating hours in 2008 and 3,076 hours in 2009, or a capacity factor of 20% for the two units (the two units together would have 17,472 hours of operation at full capacity).*

*The Department agrees with Verso's contention that this steam generation flexibility, and the economic importance of maintaining it, should be considered when examining the cost-effectiveness of further controlling emissions from the facility's two power boilers. In its BART analysis, Verso followed the EPA-recommended approach when developing its baseline emissions, with the result that power boiler emissions and the cost-analysis were based on utilization rates that are not representative of operations at the mill since the combustion turbines were acquired by Verso in 2006. If actual NOx emissions were utilized, the estimated cost for add-on controls would have been more than $15,000 per ton.*[4]

*Since the five-step BART analysis considers both the technical feasibility of controls and the cost of compliance, an emission or operating cap is not required for those cases in which the projected cost of compliance is economically unfeasible. Nevertheless, while the Department is not requiring additional $NO_x$ controls on the No 1 and No. 2 Power Boilers at this point in time, we are committing to re-assess the feasibility and need for additional $NO_x$ controls at these units no later than January 1, 2013 as part of its 5-year periodic implementation plan revision.*

12)Verso Bucksport Draft license -The condition which includes proposed emission caps with the exception for a "catastrophic event" is not practically enforceable. The emission limits must be made permanent and enforceable. (1)

*The Department has amended the BART Determination for Verso Bucksport to eliminate the catastrophic event exception, and make the 250 tons per year emissions cap federally enforceable.*

13) Page 12 -The 4th paragraph should be revised to read:

"While all eastern states have depended in varying degree on CAIR" (1)

*The Department agrees and has made the suggested change.*

14) Page 14, 4th bullet -The statement, "By the time the first regional haze SIP progress report, in 2013," is not consistent with the page 21, 3rd paragraph, statement, "Maine

[4] In 2008, the boilers burned 5.6 million gallons of oil. In 2009, they burned 9 million gallons. If these rates had been employed in the $NO_x$ cost analysis, the control cost would have been $28,313/ton ($3,181,111/112tons) for 2008 and $15,234 per ton ($3,221,937/212tons) for 2009.

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commits to submitting the first progress report, in the form of a SIP revision, not later than December 17, 2012." (1)

*The Department has amended its narrative to correct the statement in the 4th bullet on page 14:*

- *"By the time of the first regional haze SIP progress report, which is due no later than December 17, 2012, the regulatory framework for the CAIR replacement should be clearer, and new modeling results should be available. It should then be possible to fine-tune regional haze plans to address any rule that EPA has promulgated to replace CAIR. Maine is committed to reviewing and updating its regional haze SIP as new information becomes available."*

15) Page 66, Figure 8-7 -Remove the footnote since the data is no longer included in the graph. Also, in the page 65 discussion of this graph, references to "emissions over this time period" and "emissions trends" should be deleted as the graph does not include multiple years of data. (1)

*The Department has made the suggested change.*

16) Page 182 -Item 2 states, "Timely implementation of BART requirements yielding a 50 percent reduction in $S0_2$ emissions from Maine sources subject to BART;" Is this statement accurate? (1)

*The Department has amended its proposal to read:*

*"Timely implementation of BART requirements at Maine sources subject to BART."*

17) Page 184 -Figure 12-5 is unclear. Maine should include a discussion of the significance of the data presented in this figure. (1)

*Figure 12-5 was intended to demonstrate the potential for contamination when small volumes of higher sulfur distillate fuel are inadvertently mixed with ultra low sulfur (15 ppm sulfur) distillate. For example, 7 gallons (or 0.1% by volume) of distillate with a sulfur content of 2,000 ppm added to 7,500 gallons ( a standard tank-truck load) of ultra-low sulfur distillate fuel would raise the sulfur content of the resulting mix by 2.0 ppm. The potential for contamination is great enough that at least one company (e.g., Marathon Oil) has recommended completely draining and/or flushing any storage vessel or transport truck compartments before introducing ultra low sulfur distillate.*

*While arguably useful in illustrating the potential for contamination of ultra-low sulfur distillate fuel, and supporting the Department's contention that there will be likely be little, if any, high sulfur distillate in use by 2018, the Department has amended its proposal by deleting this potentially confusing graphic.*

18) Draft SD Warren license -In the discussion regarding the Lime Kiln, MEDEP states

that the Recovery Boiler is subject to MACT standards. Did MEDEP mean to say that the Lime Kiln was subject to MACT standards? (1)

*The Department has corrected this misstatement in the draft SD Warren license. Although the Recovery Boiler is also subject to MACT standards, the discussion regarding the Lime Kiln should state:*

> *"The Lime Kiln is subject to MACT standards for Chemical Recovery Combustion Sources at Kraft Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills (40 CFR 63, Subpart MM)."*

19) We have concern over the success of the MANE-VU Region realizing the overall emission reductions expected by the "Ask". Although Maine is actively implementing controls of the "Ask", many States are not. There is a good possibility that reasonable progress goals that States' are setting based on full implementation of the "Ask" will not be achieved without honestly discerning which emission reductions will take place and which ones will not.

It is our recommendation that Maine consider providing discussion and additional plots of the reasonable progress goals without the "Ask" that are based on either "on the way (OTW)/on the books (OTB)" or "better than on the way" scenarios. An additional presentation, taking more realistic emission reductions into consideration, would offer a better representation of the span of control being implemented in the region. Although, we recognize that it is not within Maine's power to get other States to comply with the "Ask", none the less, the State should assess whether or not Pennsylvania, Ohio, Massachusetts, and New York will meet their share of the "Ask", and communicate and incorporate these findings. This is important given that these States were identified as key contributors to Maine's Class I areas. (2) (3)

*The Department recognizes the Commenters' concern that the MANE-VU Region may fail to realize the emission reductions anticipated by the MANE-VU "Ask. As the Commenters know, the emission reduction programs outlined by the MANE-VU "Ask" and used to establish reasonable progress goals for Class I areas in Maine and other MANE-VU states include:*

- *Timely implementation of BART requirements;*
- *A low sulfur fuel oil strategy (#2, #4 and #6 oil); and*
- *A targeted EGU strategy calling for a 90 percent or greater reduction in sulfur dioxide ($SO_2$) emissions from each of the electric generating unit (EGU) stacks identified by MANE-VU) as reasonably anticipated to cause or contribute to impairment of visibility in each mandatory Class I Federal area in the MANE-VU region.*

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*While it is true that these measures have yet to be adopted (in their entirety) by a number of MANE-VU states, it is also true that considerable progress has been made in implementing these strategies, and the Department fully expects that the MANE-VU states, and many other contributing states will adopt these or other measures yielding equivalent or greater reductions in $SO_2$ emissions. While a full review of the MANE-VU measures implementation status is beyond the scope of this response document, and recognizing that several states have not submitted their Regional Haze State Implementation Plans, it may be helpful to summarily review the status of these measures in the MANE-VU Region.*

*As a federal requirement pursuant to Section 169A of the Clean Air Act and implementing rules (40 C.F.R. Part 51, Attachment Y), the Department believes it is reasonable to assume that all BART-eligible sources will be controlled to levels approximating those used in establishing the reasonable progress goals at MANE-VU Class I areas. In the event that a state fails to implement the BART requirements, EPA is obligated to issue a Federal Implementation Plan, or FIP; there is therefore a high degree of certainty that this program will be fully implemented.*

*Several states, including Maine have enacted laws or regulations implementing the MANE-VU low sulfur fuel strategy, with New York recently passing legislation calling for the use of ultra-low sulfur distillate oil beginning 2012, and New Jersey recently promulgating rules requiring the use of ultra low sulfur distillate oil in 2014 and limiting the sulfur content of heavier oils to no more than 0.5% in 2016. Connecticut has also adopted a low-sulfur distillate fuel oil requirement that will become effective once neighboring states have the program (Connecticut has a 0.3% sulfur limit, or equivalent control, for #4, #5 and #6 fuel oil). Other MANE-VU states have enforceable commitments in their Regional Haze SIPs, and the Department expects that these states will implement this program in time to meet the 2018 regional haze deadline.*

*While the Department does not have specific knowledge regarding the implementation of the targeted EGU strategy in other states, it is our understanding that the MANE-VU states are also moving forward with the implementation of this program.*

*When addressing the Regional Haze Rule requirements for each state with Class I areas to establish reasonable progress goals providing for reasonable progress towards achieving natural visibility in each Class I area (40 CFR Section 51.308 (d)(1)), Maine and the other MANE-VU partners adhered to the EPA guidance when setting reasonable progress goals. In developing the reasonable progress goals the Class I state must consider four factors (cost, time needed, energy & non-air quality environmental impacts, and remaining useful life) when assessing the appropriateness of potential emission control strategies . Maine believes that states are obligated to include all reasonable measures (or alternative programs providing equivalent emission reductions) in their Regional Haze SIPs, and to implement these reasonable measures by 2018. While we are aware that some states do not share this interpretation of the regional haze reasonable progress goals requirements, EPA will ultimately serve as the final arbitreur of this decision when they review each state's Regional Haze SIP.*

*It is also important to note the recently revised national ambient air quality standard (NAAQS) for $SO_2$ is likely to reduce emissions across a wide range of sources and in a number of states due to both modeled exceedences and actual nonattainment for the new NAAQS. These reductions were not included when establishing the reasonable progress goals in Maine and other MANE-VU states because the new $SO_2$ NAAQS was not released until after the MANE-VU technical effort was completed, but should serve to bolster the likelihood that contributing states will meet the reduction targets embodied in the MANE-VU "Ask".*

*For a discussion on the ability of Maine to meet the uniform rate of progress requirements under the "on-the-books/on-the way" scenario, see Comment # 39.*

20) In section 1.8, the State identifies a suite of analysis methods to produce a weight of evidence approach to basic source apportionment. Although we commend the weight of evidence approach, the FWS and NPS does not consider MANE-VU's application of the CALPUFF model as within recommended modeling practices. As such, the use of non-standard models or configurations, customarily require a performance evaluation that demonstrates beneficial use, which was not presented in Maine's SIP. (2) (3)

*The CALPUFF modeling system is normally used to address the impacts of emissions from Prevention of Significant Deterioration (PSD) sources on Class I areas. Although widely utilized for this purpose, the use of CALPUFF for regional modeling where transport distances exceed 1000 kilometers, has not been widespread, and the model performance beyond 300 kilometers is subject to some level of uncertainty. The Interagency Workgroup on Air Quality Modeling (IWAQM) Phase II Report (USEPA 1998), suggests that the model tends to over-predict surface concentrations at greater than 300 kilometers transport distance.*

*MANE-VU addressed this modeling uncertainty through a performance evaluation that compared predicted to measured $SO_4$ emissions data, and (as the Commenters noted) restricted the use of the CApUFF modeling to "weight-of-evidence" purposes.*

*MANE-VU compared 2002 ambient $S0_4$ ion concentrations with the CALPUFF modeled predictions at 22 northeastern monitoring locations that utilize IMPROVE-type monitors. The CALPUFF model was found to under-predict the long-term (quarterly average) impacts for $S0_4$ ion by at least 30% for 22 of the 88 site/quarter combinations in the northeast, with most of these under-predictions occurring during the first two quarters of the year. The CALPUFF model was also found to over-predict $S0_4$ concentrations at those locations measuring mid-range quarterly average $SO_4$ ion values (i.e., those locations with neither the highest nor the lowest concentrations). Measured quarterly averages generally show that the average over- and under-prediction balances out on that time scale.*

*Comparing the CALPUFF results with monitored ambient $S0_4$ concentrations over a 24-hour basis, MANE-VU found that while the model does not seriously over- or under-*

*predict for most sites, it does not match the variability of $SO_4$ ion formation at monitoring locations. For those monitoring sites in the northeast with the highest measured $S0_4$ concentrations, the model seems to be biased towards under-prediction for those sites directly downwind of the major source region, such as Maine. This implies that, given the very large percentage of $S0_2$ emissions that have been incorporated in the modeling, the modeled predictions probably represent a lower limit to the influence of these sources on the receptor areas.*

*The Department believes that the CALPUFF modeling is sufficiently rigorous to be used for weight-of-evidence purposes, and has added a reference to the performance evaluations performed in "Development of Parallel CALPUFF Dispersion Modeling Platforms for Sulfate Source Attribution Studies in the Northeast U.S." (Attachment A-4).*

21) Chapter 8, Emission Inventory. We commend Maine for being the first MANE-VU State to implement the low sulfur fuel strategy. It would be helpful to the reader if an explanation could be given as to why $SO_2$ emissions for EGUs increase between the 2018 OTB/OTW inventory and the final modeling inventory. (2) (3)

*As noted by the commenter, $S0_2$ emissions for the electric generating unit (EGU) sector increased between the 2018 OTB/OTW inventory and the 2018 final modeling inventory from 5,436 tons per year (tpy) to 6,806 tpy, respectively. This increase is due to adjustments made to the final modeling inventory that had the net effect of increasing emissions in the MANE-VU region as a whole. The adjustments included: 1) assessing the implementation of BART at eight BART-eligible units, including Maine's Wyman Station; 2) implementation of the MANE-VU EGU strategy; 3) increases in $S0_2$ emissions to estimate the effect of emissions trading under the CAIR program; and 4) emissions increases in the MANE-VU region to reflect state's best estimates that some sources predicted by the IPM model to be closed would continue to operate, and information about where and when emission controls would be installed.*

*While some of these adjustments resulted in decreases in predicted $S0_2$ emissions, the net result in Maine was an increase in $S0_2$ emissions from EGUs. The Department has added an explanatory footnote regarding this emissions increase to the regional Haze SIP narrative.*

22) We recommend that Maine add text to clarify which emission reductions assumed in the final modeling inventory (Table 8-4) are being implemented. Added language would explain questions such as: is the final modeling inventory for non-EGUs point and area source $SO_2$ emissions accurate for Maine's actual implemented controls, and are all the Best Available Retrofit (BART) emissions included in these inventories? (2) (3)

*The emission reductions assumed in the Final Modeling Inventory are fully detailed in Section 12 of the Maine Regional Haze State Implementation Plan. As noted in section 12, the actual controls implemented in Maine differ from those utilized in the Final*

*Modeling Inventory, hence the need to demonstrate that $SO_2$ emissions in Maine will be no greater than those used in the reasonable progress goals modeling.*

*The reasonable progress goals and MANE-VU control strategies were established after assessing a large number of potential emission reduction strategies in accordance with the prescribed four factor analysis:*

1) *Costs of compliance;*
2) *Time necessary for compliance;*
3) *Energy and non-air quality environmental impacts of compliance; and*
4) *Remaining useful life of potentially affected sources.*

*Ultimately, the MANE-VU members decided that the emission control strategies contained in the MANE-VU "Ask" were reasonable, and should be implemented on a state-by-state basis and as necessary to meet the reasonable progress goals. Maine did not fully adopt all of the recommended MANE-VU measures, so it was necessary to demonstrate that projected $SO_2$ emissions in 2018 will be no greater than those utilized in the 2018 reasonable progress modeling (which was used to establish the Maine reasonable progress goals). As long as projected 2018 $SO_2$ emissions in Maine are no greater than those used for the reasonable progress modeling, the modeling is valid for the purpose of establishing reasonable progress goals, and actually understates the potential visibility improvement for Maine. As discussed in Section 12.10, Maine's Share of Emission Reductions, the 2018 projected (updated) $SO_2$ emissions for Maine are significantly lower than those utilized in the MANE-VU reasonable progress modeling.*

*Although it might be desirable for the final modeling inventory to be based on the actual controls being implemented in each state, doing so could only be done <u>after</u> each state had adopted it regional haze control strategies, and would necessarily be retrospective in nature. Given the time constraints under which the Regional Haze SIPs were being developed, a retrospective look at emissions in each state after each state adopted its regional haze control strategies was not possible.*

*See also, comment # 1.*

23) An overarching concern is that it is not clear from the Maine BART documents (posted 6/29/10) how it applied any of the five factors in the BART analyses in making its BART determinations. For example, MAINE does not appear to have given much weight to the visibility benefits that could be realized from the control strategies evaluated. At least, it is not clear how Maine applied this factor in developing its BART conclusions. As we shall discuss later, there appears to be great inconsistency among the methods used by Maine to assess and evaluate costs and benefits that would result from the various control strategies chosen by Maine as representing BART. For example, MEDEP calculates cost/ton for the Androscoggin paper mill but does not calculate cost/dv. However, for the Wyman power plant, MEDEP calculates cost/dv but does not calculate cost/ton. (2) (3)

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*The Maine BART analysis protocol is described in Section 10.7 of the Maine* Regional *Haze SIP and in Attachment M-1to the SIP (the Maine BART Process). As the Commenters know, the federal BART rule requires that, for each BART-eligible source within the state, any BART determination must be based on an analysis of the best system of continuous emission control technology available and the associated emission reductions achievable. In addition to considering available technologies, this analysis must evaluate five specific factors for each source (better known as the Five-Factor Analysis):*

1. *The costs of compliance;*
2. *The energy and non-air quality environmental impacts of compliance;*
3. *Any existing pollution control technology in use at the source;*
4. *The remaining useful life of the source; and*
5. *The degree of visibility improvement which may reasonably be anticipated from the use of BART.*

*Using the first four factors plus the NESCAUM zero-out modeling the Department preliminarily determined that 18 of the 25 BART-eligible units have existing controls that should satisfy BART technology requirements[5]. These units were not required to conduct a modeling analysis to assess the degree of visibility improvement due to the implementation of BART. The remaining sources were required to utilize CALPUFF modeling (either 1 year of data using the highest daily predicted change in deciviews, or 3 years of data using the 8th highest daily predicted change in deciview) to assess the degree of visibility improvement. While the Department anticipated that BART eligible sources would provide a variety of cost-related metrics, including costs of compliance, total annualized costs ($), cost effectiveness ($/ton), and dollars per deciview ($/dv), most Maine BART-eligible sources did not submit all of these metrics in their analyses.*

*Although the Department believes that the use of several cost-related metrics provides a more comprehensive view of the visibility benefits provided by BART (or other controls), we do not believe that the use of any specific metric should be mandatory. Given this, the Department utilized the information submitted by the BART eligible sources to determine BART on a case-by case basis while also recognizing the limitations imposed by statute at 38 M.R.S.A. §603-A, sub-§8, and the visibility improvements provided by the Maine Low Sulfur Fuel Program in 2018.*

24) The individual company BART determinations were not found in the record. Please add an Appendix to the State Implementation Plan for Regional Haze and include these documents to aid third-party reviewers to deal with the complete record. (2) (3)

*The Department has made the individual (as submitted by the sources) BART determinations available on an on-demand basis through its Regional Haze Rulemaking website.*

25) The core purpose of the BART program is to improve visibility in our Class I areas,

[5] These sources generally have visibility impacts less than 0.1 deciview.

and BART is not necessarily the most cost-effective solution. Instead, BART represents a broad consideration of technical, economic, energy, and environmental (including visibility improvement) factors.

*The Department recognizes the core purpose of the BART program, and agrees that BART is not necessarily the most cost-effective level of emission control. The Department considered all required technical, economic, energy and environmental factors during the development of its BART orders. In addition, the Department also considered the emission reductions that will be provided by the Maine Low-Sulfur Fuel Program, which mandates the use of ultra-low (15 ppm) sulfur distillate at most industrial facilities, and requires the use of low (0.5%) sulfur residual (or equivalent reduction) by 2018. The Department believes that the BART determinations, as amended in its final Regional Haze SIP submittal, establish emission control requirements that fully address both the intent and legal requirements of the BART program, while also recognizing the scheduled implementation of the low-sulfur fuel oil requirements in 2018. As the Commenter is aware, these low-sulfur fuel oil requirements are more stringent than most, if not all, BART determinations.*

26) There are at least six Class I areas impacted by Maine's BART sources. We believe that it is appropriate to consider both the degree of visibility improvement in a given Class I area as well as the cumulative effects of improving visibility across all of the Class I areas affected. The same metric should not be used to evaluate the effects of reducing emissions from a BART source that impacts only one Class I area as for a BART source that impacts multiple Class I areas. Also, evaluating impacts at one Class I area, while ignoring others that are similarly significantly impaired should not be done. Emissions savings from a source are benefits that will be spread well beyond only the most-impacted Class I area, and should be considered. While Maine presented data describing improvements to visibility at a specific Class I area that would result from the various control scenarios it investigated, the State has not explained how it incorporated this information on impacts upon all Class I areas into its BART decision.

Maine has ignored the other Class I areas where a given BART source is also causing or contributing to visibility impairment. The dollar cost per increment of visibility improvement would be substantially lower if full consideration is given to all affected Class I areas that would benefit from emission reductions. While we recognize that EPA has provided no guidance on this issue of assessing visibility benefits that would result in multiple Class I areas when emissions are reduced from a given BART source, we commend Wyoming and Oregon for their initiative in addressing the issue. We also recognize that there is no "perfect" method for addressing cumulative benefits, but we firmly believe that Maine must show how it considered the cumulative impact of the BART sources the affected Class I areas. We have suggested an approach to Maine that is consistent with available information and with the approach used by Wyoming and Oregon, and again request that MEDEP show how it has considered the cumulative benefits of potential BART reductions. (2) (3)

*Although it is true that at least six Class I areas are impacted by Maine BART sources, it is*

*important to recognize that these impacts, in most cases, are relatively insignificant. MANE-VU conducted a zero-out modeling analyses of BART-eligible sources using CALPUFF in order to provide a regionally-consistent foundation for assessing the degree of visibility improvement which could result from installation of BART controls (See Attachment L). The MANE-VU analysis provides an estimate of the maximum impact that any BART source might have on both individual Class I area, and cumulatively across all Class I areas. The MANE-VU effort modeled the following total ($SO_4$, $NO_x$ and $PM_{10}$) visibility impacts for all Maine BART-eligible sources at MANE-VU and VISTAS Class I areas:*

*ALL BART-eligible (2002 baseline) SOURCE IMPACTS (dv's)*

| | *ACAD* | *MOOS* | *GRGU* | *LYBR* | *BRIG* | *DSOD* | *JARI* | *OTCR* | *SHEN* |
|---|---|---|---|---|---|---|---|---|---|
| *MAINE* | *6.689* | *6.523* | *2.174* | *0.821* | *0.579* | *0.107* | *0.125* | *0.100* | *0.172* |

*Reviewing these impacts, it will be quickly noted that even cumulatively (and across all regional haze pollutants), Maine BART sources have visibility impacts greater than 0.5 deciviews at only five Class I areas. Remembering that these are the modeled benefits of eliminating all emissions from these sources (i.e., "zeroing-out"), it can be seen that BART controls are unlikely to provide significant visibility improvements outside of the Maine and New Hampshire Class I areas.*

*On an individual basis, the impacts are even lower. Table 10-2 of the Maine Regional Haze SIP illustrates the total impacts (modeled) of individual Maine sources on Class I areas in Maine and New Hampshire using both the NWS and MM5 meteorology. Of the 23 BART-eligible sources in Maine, only six had modeled impacts (on all Maine and New Hampshire Class I areas combined) of more than 0.5 deciviews. While the Department commends the States of Oregon and Wyoming for their aggressive approach in implementing BART, we believe that their cumulative impacts approach is the exception, and not the norm. The Department worked closely with EPA to ensure that all applicable requirements were met in the development of its BART protocol.*

*It must also be remembered that neither Oregon nor Wyoming has adopted additional reasonable progress controls such as those included in the MANE-VU "Ask". As noted in the Maine Regional Haze SIP, the Maine Low Sulfur Fuel Program will, in most every case, supersede BART control limits. Unlike Oregon or Washington, the BART requirements in Maine represent only an initial increment of visibility improvement, other programs will provide visibility improvements beyond BART by 2018.*

27) Based upon our reviews of BART analyses across the U.S., we believe that cost-per-deciview ($/dv) of visibility improvement is the most-common and most-useful parameter for assessing the cost-effectiveness of strategies to improve visibility in Class I areas. Our compilation of BART analyses across the U.S. reveals that the average cost/dv proposed by either a state or a BART source is $13 - $20 million, with a maximum of almost $50 million/dv proposed by Colorado at the Martin Drake power plant in Colorado Springs. (2) (3)

*The Department is in agreement that the cost-per-deciview ($/dv) of visibility improvement provides a useful parameter for assessing the cost-effectiveness of potential control strategies under BART. At the same time, although certainly very useful in the BART-determination process, cost-per-deciview should not always be the principal criterion for appropriate technology or level of emission control for a BART-eligible source.*

*The Department also believes that it is prudent to consider all relevant information during the BART determination process, and not limit the scope of its BART analyses. As noted in the final Maine Regional Haze State Implementation Plan submittal, and in Comments # (10 and 25), BART sources in Maine will be subject to very stringent distillate and residual oil fuel sulfur limits by 2018. The Department believes that the Maine Low Sulfur Fuel Program, as described in Section 12.9.1 of the Maine SIP must be factored into the decision matrix for BART determinations in Maine, for this program will ultimately provide emission reductions (and visibility improvements) far exceeding those of the BART program and across a much wider range of source categories. In addition, it must be noted that existing Maine statute (38 MRSA §603-A, sub-§8) limits the Department's authority to impose mandatory sulfur emission reductions. Under the enabling authority, BART is limited to either: (1) Require the use of sulfur oil having 1% or less of sulfur by weight; or (2) Be equivalent to a 50% reduction in sulfur emissions from a BART eligible unit based on a BART eligible unit source emission baseline determined by the department under 40 Code of Federal Regulations, Section 51.308 (d)(3)(iii)(2006) and 40 Code of Federal Regulations, Section 51 Attachment Y (2006).*

*The Department has worked with Maine BART-eligible sources within the confines of this legislation to craft determinations that will maximize the short-term (2013) visibility improvement from the BART program. In fact, some Maine BART sources are voluntarily limiting their $SO_2$ emissions through programs that go above and beyond the control limits of the enabling statute.*

28) In the Best Available Retrofit Technology (BART) determination section for FPL Energy Wyman, LLC, three unlabeled tables identify visibility benefits based on 1st and 8th high values (page 110). Our understanding is that the quality and quantity of meteorology used during the BART determinations fall within the recommended modeling practices. Maine voluntarily agreed to limit evaluations to 1st high values in lieu of generating 3 years of quality meteorological input. Please communicate that the State did not use the 8th high to base their BART conclusion.

*Maine's BART Modeling Protocol (Attachment M to the Maine Regional haze SIP) allowed sources to utilize "1st high" values in lieu of generating 3 years of meteorological inputs. In addition, sources could also utilize the "8th high" value, provided they also generated 3 years of quality meteorological input.*

*FPL Energy Wyman, LLC utilized 1 year of MM5 data with mandatory observational data as obtained from the Massachusetts Department of Environmental Protection. Although the source provided cost-effectiveness and incremental visibility improvement*

*analysis for the 8th high value, this information was not used in the Department's BART determination because it does not follow the prescribed modeling protocol. The Department has amended the BART discussion for FPL Energy Wyman to eliminate any confusion.*

29) The Power Boiler #1 and #2, and the Waste Fuel Incinerator (WFI) units at Verso Androscoggin Paper Mill (Verso Androscoggin, LLC) are BART eligible. Both SCR and SNCR are evaluated for each of these units as BART options for controlling $NO_x$ emissions. In each case, we have concerns with the cost estimation methodologies used: annual reagent and catalyst costs are significantly above what should be expected, capital recovery factor calculations use annual interest rates nearly double the standard of EPA's *OAQPS Air Pollution Cost Control Manual*, and recovery periods only half as long, and there are unexplained differences between the company's proposal and the Maine cost estimates. In summary, our data indicates that both SCR and SNCR should be considered as viable $NO_x$ BART conclusions for these units. Please see the detailed comments contained in Attachment 1 for specifics. (2) (3)

*See Response to Comment #12, above.*

30) We believe that lower sulfur residual oils should be more fully evaluated as an $SO_2$ BART option for the Verso Androscoggin, LLC Power Boilers. Please see the detailed comments contained in Attachment 1 for specifics. (2) (3)

*See Responses to Comments #10, 25 and 27, above.*

31) We also have several questions regarding the $SO_2$ BART conclusion for the WFI. Please see the detailed comments contained in Attachment 1 for specifics. (2) (3)

*The Verso Androscoggin Waste Fuel Incinerator (WFI) is licensed to fire biomass and oil, with biomass including sludge, wood waste (including bark, knots and screenings, etc.), cotton residue, sawdust absorbed with oil, and waste papers. Oil shall include #2 and #6 fuel oil, specification used oil, off specification used oil, and oily rags, each with a maximum sulfur content not to exceed 1.8% by weight. The firing rate capacity of the WFI depends on what fuel or fuel mixture is being combusted. The $SO_2$ emission limit for the WFI is 0.80 lb/MmBtu on a 3-hour rolling average.*

*As the Commenters noted, the WFI has very low $SO_2$ emissions* (~50 tons per year) *due to the inherent alkalinity (i.e., $SO_2$ control) of the primary fuel and the limited quantity of fuel oil used in the WFI. During those times in which fuel oil is combusted, the source's Title V Air Emission License (A-203-7-A-I) provides for the use of either a weak white liquor and/or caustic solution to control the scrubber media pH (and emissions), if necessary to meet the licensed emission limits for the unit. The Title V license does not require the use of white liquor and/or caustic, rather it allows its use if necessary.*

*Since the use of a weak white liquor and/or caustic solution when firing oil is discretionary, and not always necessary to meet licensed limits, it cannot be treated as an*

*existing control and simply "codified" as BART. The Department does not support mandating its use (at a cost-effectiveness of more than $20,000/ton and little or no perceptible visibility benefits), and considers the continued operation of the variable throat venture scrubber and demister, along with the existing$SO_2$ emission limit of 0.80 lb/MmBtu (on a 3-hour rolling average) to constitute BART for this source.*

32) Power Boilers #3 and #4 at the FPL Energy Wyman Station (FPL Energy Wyman, LLC) are BART-eligible units. The State's $SO_2$ BART analysis appears to be the only BART analysis conducted by Maine in which cost-effectiveness was not evaluated in terms of annual cost/ton of pollutant removed. Instead, Maine appears to have relied solely upon annual cost/deciviews (dv) of visibility improvement. While we encourage the use of the $/dv metric, it was not properly calculated nor applied in this case. Using the data available in the BART analyses, we assessed the cost per ton of $SO_2$ reduced by the BART options, as well as corrected $/dv calculations. Based upon the results, we believe that it is reasonable to conclude that 0.5% -0.3% sulfur fuels are BART for the FPL boilers. See the discussion in Attachment 2 to these comments for further details. (2)(3)

*As previously noted in Comment # 23, above, Maine did not prescribe the cost-effectiveness criterion to be utilized by BART-eligible sources when performing their analyses. While most sources undertaking a full analysis chose to provide both dollars per ton ($/ton) and dollars per deciview ($/dv) metrics, FPL Energy Wyman provided only $/dv metrics. While the Department agrees that it would be reasonable to conclude that 0.5%-0.3% low sulfur fuel would constitute BART in the absence of a broad low-sulfur fuel oil program as adopted by Maine and described in Section 12..9.1 of the Maine Regional Haze SIP, the existence of this program leads us to a different conclusion for Maine sources. The Department believes that the use of 0.7% low-sulfur fuel oil constitutes an appropriate level of BART control for this facility. For additional information, seeComments # 10, 25 and 27, above, and Sections 10.3 and 12.9.1 of the Maine Regional Haze SIP.*

33) We are confused as to the BART status for Power Boiler #1 at the SAPPI SD Warren Company Paper Mill. While the company-prepared BART analysis (September 2009) did not mention this unit, the January 21, 2010, Maine BART analysis does identify and analyze BART controls for Power Boiler #2. The final Maine BART analysis for the facility, posted on June 29, 2010, is again silent on this unit. Please explain the BART eligibility status for the SAPPI SD Warren Paper Mill Power Boiler #1, and include any appropriate BART determination in the final SIP. Supporting information for this comment is included in Attachment 3 to these comments. (2) (3)

*See Response to Comment #9, above*

34) The State did a good job of reflecting the five-factor BART protocol in the Departmental Findings of Fact and Order for the Domtar Maine, LLC – Woodland Mill. Section II makes reference from the company BART determination to a Dry Electrostatic Precipitator BART alternative estimated to cost $4,640 per ton of particulate matter

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removed. It also makes reference to the Selective Non-Catalytic Reduction (SNCR) BART alternative estimated by the company to cost $7,360 per ton of $NO_x$ removed. If the detailed information correctly supports the values shown above, then it may be reasonable to conclude that the cost per ton of removal was excessive. Maine seemed to rely solely upon the MANE-VU visibility data to evaluate in a general way the visibility impact of a given unit on nearby Class I areas, but individual modeling of each BART alternative was not performed. In the case of the Woodland Mill it seemed that by concluding that an alternative was not cost-effective on a cost per ton basis, Maine believes that the specific cost of visibility improvement was not necessary. Normally, the visibility cost step is performed, even if cost per ton is deemed to be excessive. Existing $SO_2$ controls on Power Boiler #9 and the Lime Kiln seemed to be considered 'top controls', so further cost analysis was not necessary. (2) (3)

*The Department appreciates the Commenters' thorough review of the Domtar Maine, LLC BART determination.*

35) As we understand, Maine proposes that Lincoln Paper and Tissue, LLC be allowed to burn 2% S fuel oil. Additionally, $SO_2$ emissions from the recovery boiler shall be controlled to 141 ppmv (dry basis) @ 8% $O_2$ on a 24-hour block average basis when firing only black liquor or when firing a combination of black liquor and oil. The recovery boiler fires #6-fuel oil. Oil fired in the recovery boiler alone shall not exceed 0.7% sulfur by weight or 2.0% sulfur by weight when firing a combination of black liquor and oil. The recovery boiler is fired with fuel oil for startup purposes (in order to initiate Black Liquor Solids (BLS) firing) in addition to shutdowns and other events which require the addition of oil firing. Maine should explain why use of lower sulfur (0.7% S) fuel (that is already used when the recovery furnaces fires 100% #6 oil) would incur a capital cost that made use of that fuel all the time too expensive. The Lincoln Paper and Tissue BART determination is deficient because it does not evaluate the use of 0.7% fuel oil at all times. (2) (3)

*The Department does not believe that the use of fuel oil with a sulfur content of less than 2.0% is necessary when firing a combination of fuel oil and black liquor because the co-firing process inherently has very low $SO_2$ emissions. The recovery boiler process includes:*

1. *Combustion of organic material in the black liquor to create steam;*
2. *Reduction of inorganic sulfur compounds to sodium sulfide, which exits the bottom of the recovery boiler as smelt;*
3. *Production of a molten inorganic flow composed primarily of sodium carbonate and sodium sulfide, which is later recycled;*
4. *Recovery of inorganic dust from the flue gas; and*
5. *Production of sodium fume to capture the combustion residue of released sulfur and sulfur compounds.*

*The sodium-rich environment of the recovery boiler results in the reduction of inorganic sulfur from both the black liquor, and also from any fuel used in co-firing. As a result,*

*when co-firing black liquor with fuel oil, the fuel sulfur content plays little, if any role, in $SO_2$ air emissions. For those periods that black liquor is not being fired, the conversion of inorganic sulfur compounds to sodium sulfide is not taking place, hence the Department's requirement to burn low-sulfur fuel oil at these times.*

36) Based upon the 6/29/10 BART analysis, Maine has determined that for $NO_x$, Dragon Products Company shall operate an SNCR (Selective Non-Catalytic Reduction) system to reduce $NO_x$ emissions from the calciner to achieve a 45% control efficiency. $NO_x$ emissions from the kiln system shall be limited to 350.0 lb/hr on a 90 day rolling average and 1533.0 tons/year on a 12 month rolling total basis. We concur. (2) (3)

*The Department appreciates the Commenters' support.*

37) Maine is limiting emissions from Katahdin Paper's only BART source to < 250 tpy to exempt it from BART. We concur. (2) (3)

*The Department appreciates the Commenters' support.*

38) Maine is limiting emissions from Red Shield Acquisition, LLC's only BART sources to < 250 tons/year to exempt it from BART. We concur (2) (3)

*The Department appreciates the Commenters' support. However, Red Shield Acquisition, LLC has subsequently decided to undertake a BART analysis of its #4 Recovery Boiler and Lime Kiln in lieu of a federally-enforceable cap of 250 tons per year. The Department has included the results of the BART analysis for this source in its final Regional Haze SIP.*

39) Maine is limiting emissions from Rumford Paper to less than 250 tons per year so as to exempt it from BART. Please assure that Departmental Findings of Fact and Order or other federally enforceable documents are promulgated to define the emission limitations and place them in the official BART record. (2) (3)

*The Department has made the suggested change.*

40) MEDEP is capping the Verso Bucksport paper mill (Verso Bucksport, LLC) out of BART, but did not post the actual permit that does so. Please post the pertinent permit. (2) (3)

*The Department has included the Verso Bucksport, LLC BART determination in its final proposal. Although the draft BART determination was posted on the Department's Regional Haze Website, some users experienced difficulty in accessing some BART determinations on the FTP site due to system incompatibility.*

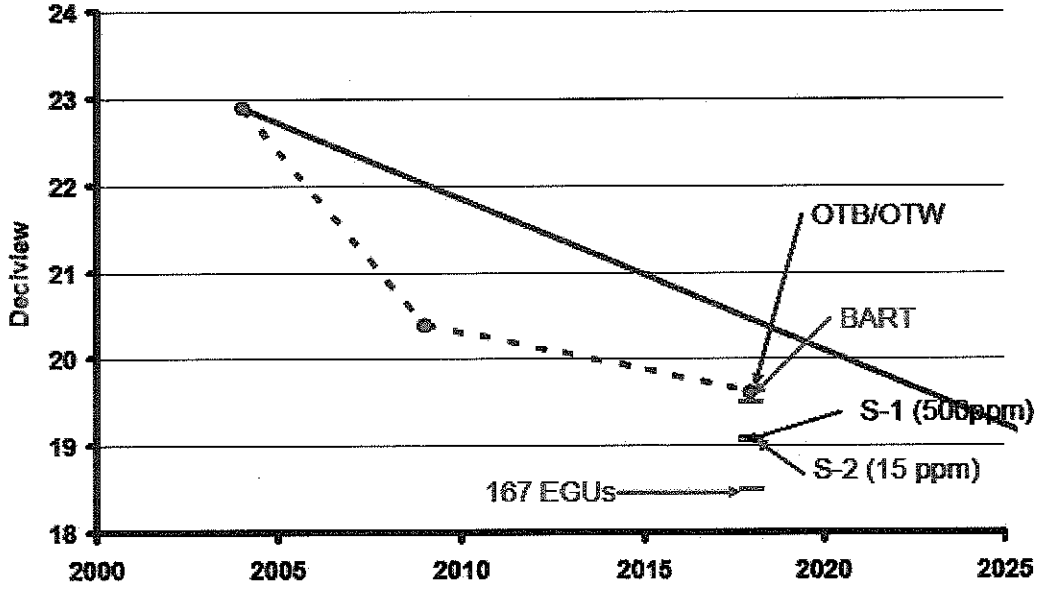
41) By setting reasonable progress goals based on the "Ask", rather than the OTW/OTB inventory, the MANE-VU States have made it more difficult to demonstrate that they have implemented the controls necessary to meet the reasonable progress goals. It would

be helpful for Maine to discuss whether or not the OTW/OTB controls were sufficient to meet the uniform rate of progress at the Maine Class I areas. (2)(3)

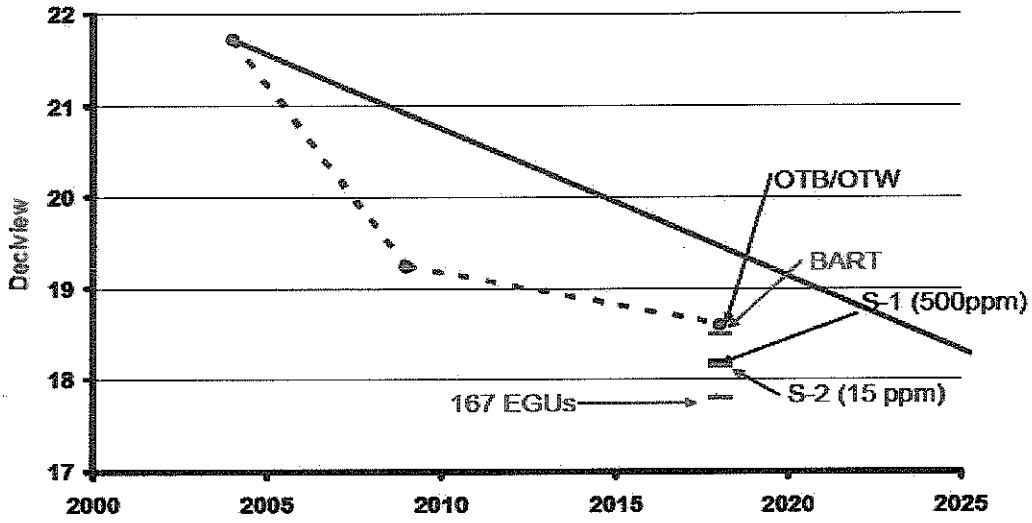
*As part of its reasonable progress goals modeling effort, MANE-VU modeled the projected visibility improvement at MANE-VU Class I areas that would result from the implementation of "on-the-book/on-the-way (OTB/OTW) controls in the MANE-VU region and other RPOs.*

*The following graphics (from the NESCAUM Report "MANE-VU Modeling for Reasonable Progress Goals") illustrate that the emission reductions modeled under the OTB/OTW scenario, are sufficient to meet uniform rate of progress at Maine Class I areas:*

**Visibility Improvement Relative to Uniform Rate of Progress at Acadia National Park**




**Visibility Improvement Relative to Uniform Rate of Progress at Moosehorn National Wildlife Refuge and Roosevelt-Campobello International Park**




*It must be remembered, however, that EPA guidance for setting reasonable progress goals requires states to consider reviewing all measures identified through the four-factor analysis process and to adopt each measure that is determined to be reasonable. Maine and the MANE-VU membership believe that the four-factor analysis provision in the Clean Air Act requires states to analyze additional measures, and adopt those that are reasonable. Maine believes that the measures identified and known as the MAINE-VU "Ask" are, in fact reasonable, and that these or other measures providing equivalent emission reductions, must be adopted by each state.*

42) On page 133, the statement is made that MANE-VU States have up to 10 years to implement reasonable controls. We believe this to be incorrect statement. It is our understanding that the regional haze rule requires the controls to be in progress (e.g., BART determination or rule requirement) when the Regional Haze SIP is submitted as final. (2) (3)

*The Department agrees with the Commenters that this statement is incorrect. When originally drafted in 2008, this statement was valid, in that states would have had up to 10 years to implement additional reasonable controls as determined by the MANE-VU membership. With the Maine Regional Haze SIP now on track for submittal in late 2010, a 10 year implementation "window" would mean that reasonable measures were not implemented prior to the July 31, 2018 planning deadline. The Department has amended its proposal to read:*

*"Under this plan, the affected states will have until July 31, 2018 to implement reasonable and cost-effective control measures to reduce primarily $SO_2$ and $NO_x$ emissions."*

*With regard to the federal Regional Haze Rule requirements, the Department understands that EPA cannot fully approve a Regional Haze Sip unless all measures are adopted and will be (federally) enforceable.*

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43) Table 11-5 summarizes SO2 emissions in 2002 and 2018 modeling inventory for 12 sources that were assumed to be required to install BART controls. A similar table which summarizes actual BART reductions for Maine sources would be extremely helpful. (2) (3)

*The Department has included a similar table detailing projected emission reductions attributable to the application of BART to Maine BART-eligible sources in Section 10 of the Maine Regional Haze SIP.*

44) MANE-VU indicated that emissions were backfilled in the final inventory calculations in order to fully meet the Clean Air Act Interstate Rule (CAIR) cap. When this backfill method was applied to sources outside of MANE-VU emission rates for some sources were overestimated, ignoring State rules and consent decrees. Please explain in more detail how Maine consulted with these non-MANE-VU States and how the results from this consultation were reconciled in making these emission control decisions.

*MANE-VU worked closely with other RPOs (VISTAS, MRPO, and CENRAP) in the development of its modeling inventories, ultimately utilizing the VISTAS "Base G2" inventory as the basis for further adjustments that incorporated additional state changes and the MANE-VU regional haze control strategies as detailed in the MANE-VU "Ask". One of these adjustments involved "backfilling" or increasing $S0_2$ emissions at some facilities/regions to estimate the effect of the MANE-VU EGU Control strategy and emissions trading under the CAIR program.*

*The emissions impacts of the MANE-VU EGU Control Strategy were developed by MARAMA, after gathering information from MANE-VU, MRPO and VISTAS states, and regional organization staff. These stakeholders reviewed and revised the IPM results to reflect the controls panned to come online, and verify that known and existing controls and emission rates were reflected in the IPM runs. As part of these consultations, adjustments were made to specific units using information provided by the states, including which units would install controls and when these controls would come on-line. In addition to the 167 stacks MANE-VU incorporated further corrections to source emissions as requested by VISTAS states at specific units.*

*During this process, MANE-VU recognized that under CAIR, reductions at one unit due to the MANE-VU EGU Control Strategy could offset by increases at another unit within the CAIR region. Under this scenario, even though MANE-VU EGU Control Strategy would reduce $SO_2$ emissions in the three RPOs by more 515,000 tons from the targeted units, total EGU emissions would not decrease because most states do not restrict emissions trading. In an effort to address the effect of emissions trading, MANE-VU decided that emissions should be increased ("backfilled") within the CAIR region. For MANE-VU, 75,809 tons were added back, leaving the total regional emissions from the MANE-VU region greater than the original inter-RPO (IPM) estimate, but consistent with state projections. The remaining 440,541 tons were allocated to the MRPO and*

*VISTAS based on the fraction of their contribution to total $SO_2$ emissions. The intent of the final EGU adjustments was to retain the same level of emissions as predicted by the RPO CAIR IPM run for the three regions together. The location of the emissions, however, were modified to better reflect the state's estimates of where emissions reductions would be achieved, and to reflect reductions at the 167 stacks indentified by the MANE-VU EGU strategy.*

*Overall, regional emissions increased in both the MANE-VU and VISTAS region, and declined in the MRPO (in comparison with the RPO 2.1.9 IPM run). As noted above MANE-VU worked closely in the development of both the VISTAS "Base G2" and during the development of the MANE-VU adjustments used in the final modeling inventory, and provided several opportunities for state agencies and regional staff to note state programs and consent decrees (section 12 of the Maine State Implementation Plan for Regional Haze provides an overview of state programs and consent decrees that were included in the regional modeling). While the Department believes that most, if not all, of these relevant controls were incorporated in the final regional modeling, it is important to note that under an un-restricted emissions trading program such as CAIR, these specific state control programs and consent decrees would arguably have little impact on total $SO_2$ emission in the CAIR region (reductions at these facilities could be offset by increases at other facilities).*

45) In the Long Term Strategy Section, (Section 12.7.2), please identify whether the State implements a smoke management plan. If so, identify whether the program is voluntary or mandatory and whether the impacts to the Class I areas are considered during the process. (2) (3)

*Although Maine has adopted a number of programs designed to address wood smoke emissions (see section 12.7.3 of the Maine Regional Haze SIP, it has not adopted an agricultural and forestry smoke management plan per se. Agricultural and forestry open burning activities are regulated by statute at 4 MRSA Section 9321 et seq., with 4 MRSA Section 9325 stating (in relevant part):*

***"§9325. Open burning***

***1. Permissible open burning with permit.*** *When not prohibited by statute, rule of any state agency or local ordinance, the types of burning described in this subsection are allowed provided that a permit has been obtained from the town forest fire warden or from the forest ranger having jurisdiction over the location where the fire is to be set. The burning must be conducted according to the terms and conditions of the permit and may not create a nuisance. A permit is required for:*

*A. Recreational campfires kindled when the ground is not covered by snow; [1991, c. 36, §4 (NEW).]*

*B. Fires in conjunction with holiday and festive celebrations; [1991, c. 36, §4 (NEW).]*

*C. Burning of solid or liquid fuels and structures for research or bona fide instruction and training of municipal, volunteer and industrial firefighters when*

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*conducted under the direct control and supervision of qualified instructors; [1991, c. 36, §4 (NEW).]*

***D. Burning for agricultural purposes including, but not limited to, open burning of blueberry fields, potato tops and hayfields and prescribed burning for timberland management; [1991, c. 36, §4 (NEW).] (emphasis added)"***

*4 MRSA Section 9321 establishes a number of mandatory criteria for open burning activities, but does not specifically address impacts on Class I areas.*

46) Table 12-1 lists non-CAIR BART facilities that were modeled. Please confirm the modeled emissions are consistent with the actual BART determinations.

*It is the Department's understanding that the estimated reductions for the twelve BART-eligible units in the MANE-VU states that would probably be controlled as a result of BART requirements are consistent with actual BART determinations- at least for those sources located in the State of Maine. As noted in Comment #9, above, it was subsequently determined that the SAPPI (SD Warren) No.1 Power Boiler is not a BART-eligible source, but the modeled emissions for this source are consistent with projected emissions for 2018. In fact, the MANE-VU reasonable progress modeling actually underestimated the emission reductions attributable to the application of BART to Maine BART-eligible sources, which can be seen by comparing Table 10-9 with Tables 11-5 and 12-1.*

*Since the other non-CAIR BART-eligible units are located in Maryland and New York, the Department is unable to confirm that the actual BART determinations for these sources are fully consistent with modeled emissions, since these States have not completed final BART determinations for these sources. It is the Department's understanding that the final BART determinations from these States will be at least as stringent as those modeled.*

47) It should be stated earlier in the document that Maine will be fully meeting the "Ask" by 2018. Providing a statement to this effect at the beginning of the document will address reader questions earlier in the review of RHSIP.

*The Department agrees with the Commenters and has added a statement that Maine will be fully meeting the "Ask" to section 3.6 Meeting the Ask- Maine.*

49) In section 12.12, the State has done a good job discussing its commitment to ensure that the New Source Review/ Prevention of Significant Deterioration (PSD) Program in the State will work towards the interests of their regional haze goal by including Section 12.12. This section links reasonable progress for visibility to the Prevention of Significant Deterioration requirements.

*The Department appreciates the Commenters' support.*

50) The Table on Page 110 (as it pertains to Wyman Unit 3) contains an apparent

typographical error. The Particulate Matter Emission Limit is listed as 0.15 lb/Mmbtu (referenced BART order). This appears to be a typo as the PM limit for Unit 3, according to the BART Order (December 11, 2007), is 0.18 lb/Mmbtu. (4)

*The Department has amended its proposal to properly note that the final BART order particulate emission limit for Wyman Unit 3 is 0.18 lb/MmBtu.*

**ATTACHMENT 1 To NPS/FWS Comments -Maine Draft Regional Haze SIP**

**NPS Comments Regarding Verso Androscoggin Paper Mill BART Evaluation July 23, 2010**

Power Boilers #1 & #2: $NO_x$

The following statement by Verso is misleading: The Androscoggin Mill followed the guidance and procedures outlined in 40 CFR Part 51, Appendix Y and the OAQPS Air Pollution Cost Control Manual. Supporting cost evaluation spreadsheets are provided in Attachment C, Table Nos. C-1, C-2, C-3, and C-4.

While we applaud Verso's intent to use the Cost Manual, the actual Verso approach appears to have borrowed the Cost Manual method for evaluating wet scrubbers and applied it to SCR and SNCR, which we believe is inappropriate.

In actuality, there is no *OAQPS Air Pollution Cost Control Manual* (Cost Manual) procedure for evaluating costs for SCR or SNCR for **oil-fired** EGUs. The procedures described by the Cost Manual are intended for use with **coal-fired** boilers > 250 mmBtu/hr. So we adapted them to oil-fired boilers (see electronic attachment), but the cost algorithms for the Direct Capital Costs are from the Cost Manual coal-boiler method and therefore questionable.

Even if we accept the Verso approach as a default, it still contains some highly questionable estimates for SCR, and Verso clearly did not follow the Cost Manual:

- If we assume that Power Boilers #1 & #2 are capable of producing about 68 MW each, then the Total Capital Investment (TCI) per kW is about $115 for SCR, which is in the middle of the $50 -$260/kW range for coal-fired EGUs. We have applied an adapted Cost Manual approach which estimates a slightly higher TCI. We will provide an electronic Excel workbook containing that data via e-mail to MEDEP staff.
- Verso has estimated an annual reagent cost of $414,000/boiler. This exceeds the $54,000 annual reagent cost that the Cost Manual procedure estimates. Verso must justify this estimate.
- Verso has estimated an annual catalyst replacement cost of $155,000/boiler. Since this exceeds the $92,000 annual catalyst replacement cost that the Cost Manual procedure estimates for the 330 MW Naughton Unit #3 (that Wyoming is requiring to install SCR as BART), the Verso estimate appears to be very high. Our adapted Cost Manual method estimates catalyst volume at 88 m3, a 24,000 hour catalyst life, and an annual Catalyst Replacement Cost = $41,000/boiler. Furthermore, because most catalyst vendors do not charge for recovery of the spent catalyst, that $30,000 annual cost also appears unfounded.
- Verso's Capital Recovery Factor (12.4% interest over a 10-year SCR life) is inflated. The Cost Manual recommends 7% interest over a 20-year SCR life.[1]
- Verso estimates an annual cost of $5.1 million to control both boilers versus our estimate of $1.1 million for each boiler, and Verso estimates $7,361/ton versus our $3,070/ton.

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[1] Verso assumed a $0.08/kWh cost for electricity.

According to Maine Department of Environmental Protection (MEDEP):

> *The cost effectiveness numbers in the table above are based on controlling NOx emissions from Power Boilers #1 and #2 at the control effectiveness rates indicated in the table from the highest estimated two year average annual emissions between 2002 and 2008. In recent years (2008 and 2009) these boilers have been operating close to only 20% of the time, which for example, would result in an actual cost effectiveness of $16,313 per ton of NOx removed with the installation of SCR.*

MEDEP estimates cost-effectiveness at $5,271/ton versus the $7,361/ton estimated by Verso; we request an explanation for this difference. Furthermore, if MEDEP intends to consider the reduced operation of these boilers in the economic analysis, those reduced operational parameters should be made federally enforceable if they affect the outcome of the analysis.

Because BART is a visibility improvement program, we believe that cost/deciview ($/dv) is a very important parameter. In this case, for the four Class I areas evaluated by Verso, SCR would improve visibility by a total of 4.6 dv. (We would also like to see the visibility improvements that would occur in the other two Class I areas.) This results in a cost-effectiveness value of less than 0.5 million/dv, which is quite reasonable compared to the average $13 -$20 million/dv that we are seeing accepted by states and sources that are proposing reductions under BART. Even if one considers only the visibility improvement at Acadia National Park, the addition of SCR results in a cost-effectiveness value of $1.3 million/dv. This leads to the conclusion that SCR is BART for the Androscoggin power boilers.

The same situation applies to SNCR. The actual Verso approach appears to have borrowed the Cost Manual method for evaluating wet scrubbers and applied it to SNCR, which we believe is inappropriate. Even if we accept the Verso approach as a default, it still contains some highly questionable estimates for SNCR:

- If we assume that Power Boilers #1 & #2 are capable of producing about 68 MW each, then the Total Capital Investment (TCI) per kW is about $47 for SNCR, which is on the high end of the $29 -$45/kW range we are seeing in proposals to install SNCR on coal-fired EGUs (See http://www.wrapair.org/forums/ssjf/bart.html). We have applied an adapted Cost Manual approach which estimates a $26/kW. We will provide an electronic Excel workbook containing that data via e-mail to MEDEP staff. Verso should provide vendor quotes to support its higher-than expected estimates.
- Verso has estimated a Direct Annual Cost (DAC) of $0.55 million/boiler. Since this exceeds the $0.12 million DAC that the Cost Manual procedure estimates, the Verso estimate appears to be very high. The biggest difference is in Verso's estimate of almost $0.5 million/year/boiler for reagent versus the Cost Manual estimate of $0.06 million/yr.
- Verso's Capital Recovery Factor (12.4% interest over a 10-year SNCR life) is inflated. The Cost Manual recommends 7% interest over a 20-year SCR life.[2]
- Verso estimates an annual cost of $2.6 million to control both boilers versus our estimate of $0.29 million for each boiler, or Verso's $9,758/ton versus our $2,128/ton.

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[2] Verso assumed a $0.08/kWh cost for electricity.

MEDEP estimates cost-effectiveness at $5,973/ton versus the $9,758/ton estimated by Verso; we request an explanation for this difference.

In this case, for the four Class I areas evaluated by Verso, SNCR would improve visibility by a total of 4.3 dv. (We would also like to see the visibility improvements that would occur in the other two Class I areas.) This results in a cost-effectiveness value of less than 0.13 million/dv, which is quite reasonable compared to the average $13 -$20 million/dv that we are seeing accepted by states and sources that are proposing reductions under BART. Even if one considers only the visibility improvement at Acadia National Park, the addition of SCR results in a cost-effectiveness value of $0.41 million/dv. This leads to the conclusion that SNCR could also be a candidate for BART for the Androscoggin power boilers if SCR is rejected.

Power Boilers #1 & #2: $SO_2$

Some comments on Verso's BART analysis for $SO_2$ from the Androscoggin mill Power Boilers #1 &#2.

Power Boilers #1 & #2 wet scrubber cost analysis

- Verso's Purchased Equipment Costs are not supported or justified.
- Is there a state sales tax exemption for pollution control equipment?
- Verso's Maintenance costs are not supported or justified.
- Verso's Utilities costs are not supported or justified.
- Can Verso use waste caustic from the mill to augment caustic purchases? (We are seeing this at other mills.)
- Verso's annualized costs do not make sense--the numbers do not work out as presented.[3]
- Verso overestimated the interest rate and underestimated equipment life. According to the OAQPS Control Cost Manual, the correct interest rate is 7% and the correct equipment life is 15 years.

Verso's Power Boilers #1 & #2 lower sulfur fuels analysis is incomplete. For example,[4] FPL evaluated 1%S residual, 0.5% S residual and 0.3% S residual fuel oils for its Wyman facility, Verso should at least evaluate the lower sulfur residual oils.

Waste Fuel Incinerator (WFI): $NO_x$

We adapted *the OAQPS Air Pollution Cost Control Manual* (Cost Manual) procedure for evaluating costs for SCR or SNCR for oil-fired EGUs to oil-fired EGUs (see electronic attachment), but the cost algorithms for the Direct Capital Costs are from the Cost Manual coal-boiler method and therefore questionable. So, even if we accept the Verso approach as a default, it still contains some highly questionable estimates for SCR:

- If we assume that the WFI is capable of producing about 48 MW, then the Total Capital Investment (TCI) per kW is about $165 for SCR, which is in the middle of the $50

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[3] Verso assumed a $0.08/kWh cost for electricity. [4] In Massachusetts, sources evaluated 1%S residual, 0.5% S residual, 0.3% S residual, 0.3% S distillate, 0.05% S distillate, and 0.0015% S distillate.

$260/kW range for coal-fired EGUs. We have applied an adapted Cost Manual approach which estimates a slightly lower TCI. We will provide an electronic Excel workbook containing that data via e-mail to MEDEP staff.

- Verso has estimated an annual reagent cost of $286,000. This exceeds the $72,000 annual reagent cost that the Cost Manual procedure estimates.
- Verso's Capital Recovery Factor (12.4% interest over a 10-year SCR life) is inflated. The Cost Manual recommends 7% interest over a 20-year SCR life.
- Verso estimates an annual cost of $2.4 million to control the WFI[5] versus our estimate of $0.9 million, or Verso's $5,092/ton versus our $1,986/ton.

MEDEP estimates cost-effectiveness at $4,676/ton versus the $5,092/ton estimated by Verso; we request an explanation for this difference.

Because BART is a visibility improvement program, we believe that cost/deciview ($/dv) is a very important parameter. In this case, for the four Class I areas evaluated by Verso, SCR would improve visibility by a total of 1.0 dv. (We would also like to see the visibility improvements that would occur in the other two Class I areas.) This results in a cost-effectiveness value of less than $1 million/dv, which is quite reasonable compared to the average $13 -$20 million/dv that we are seeing accepted by states and sources that are proposing reductions under BART. Even if one considers only the visibility improvement at Acadia National Park, the addition of SCR results in a cost-effectiveness value of $2.3 million/dv. This leads to the conclusion that SCR is BART for the Androscoggin WFI.

The same situation applies to SNCR. So, even if we accept the Verso approach as a default, it still contains some highly questionable estimates for SNCR:

- Although Verso stated that SNCR could achieve 35% control, its cost analysis is based upon 30% control.
- If we assume that the WFI is capable of producing about 48 MW, then the Total Capital Investment (TCI) per kW is about $65 for SNCR, which is above the high end of the $29 -$45/kW range we are seeing in proposals to install SNCR on coal-fired EGUs. We have applied an adapted Cost Manual approach which estimates a $31/kW. We will provide an electronic Excel workbook containing that data via e-mail to MEDEP staff. Verso should provide vendor quotes to support its higher-than expected estimates.
- Verso has estimated a Direct Annual Cost (DAC) of $0.41 million. Since this exceeds the $0.13 million DAC that the Cost Manual procedure estimates, the Verso estimate appears to be high. The biggest difference is in Verso's estimate of almost $0.34 million/year per boiler for reagent versus the Cost Manual estimate of $0.07 million/yr.
- Verso's Capital Recovery Factor (12.4% interest over a 10-year SNCR life) is inflated. The Cost Manual recommends 7% interest over a 20-year SNCR life.
- Verso estimates an annual cost of $1.1 million to control the WFI[6] versus our estimate of $0.27 million, or Verso's $7,009/ton versus our $1,757/ton.

[5] Verso assumed a $0.07/kWh cost for electricity. [6] Verso assumed a $0.07/kWh cost for electricity.

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MEDEP estimates cost-effectiveness at $5,944/ton versus the $7,009/ton estimated by Verso; we request an explanation for this difference.

In this case, for the four Class I areas evaluated by Verso, SNCR would improve visibility by a total of 0.2 dv. (We would also like to see the visibility improvements that would occur in the other two Class I areas.) This results in a cost-effectiveness value of less than 1.4 million/dv, which is quite a bargain compared to the average $10 -$20 million/dv that we are seeing accepted by states and sources that are proposing reductions under BART. Even if one considers only the visibility improvement at Acadia National Park, the addition of SCR results in a cost-effectiveness value of $2.7 million/dv. This leads to the conclusion that SNCR could also be a candidate for BART for the Androscoggin power boilers if SCR is ruled out.

Waste Fuel Incinerator (WFI): $SO_2$

This is what Verso says about $SO_2$ BART for the Androscoggin Waste Fuel Incinerator:

> *When No. 6 fuel oil is fired at significant levels,* ***the Mill adds caustic to the wet scrubber*** *to meet the SO2 emission limit for the WFI.*
>
> ***SO2 BART ANALYSIS Identify BART***
> *The WFI has very low SO2 emissions due to the inherent alkalinity (i.e., SO2 control) of the primary fuel and the small amount of fuel oil used in the WFI. In addition during the limited amount of time that No. 6 fuel oil is used to provide a significant amount of the heat for the WFI,* ***caustic is added to the wet scrubber****. Since there are only 50 tons of SO2 to control annually, the addition of caustic to the wet scrubber would end up controlling a very small amount of emissions on an annual basis. Considering visibility, the low, pre-control visibility impacts from the WFI mean that any visibility reductions associated with post-control of SO2 emissions would be* ***imperceptible****. Based on the information developed in the Impacts Analysis, the Androscoggin Mill believes that* ***there is no SO2 BART*** *determination for SO2 from the WFI.*

Is Verso saying that it does not want its current procedure of adding caustic to the wet scrubber when burning fuel oil to be considered BART, but will keep doing it anyway? If so, that is clearly wrong because BART would include this practice as a technically-and economically-feasible option, as proven by Verso. Finally, a control option does not have to produce a perceptible improvement to be viable.

**ATTACHMENT 2 To NPS/FWS Comments -Maine Draft Regional Haze SIP**

**NPS Comments Regarding FPL Energy Wyman Station BART Evaluation**

**July 20, 2010**

Beginning in 2006, capacity utilization of, and emissions from Units #3 & #4 dropped so much that, assuming that trend continues, it would likely be cost-prohibitive to make any substantial capital expenditures to reduce emissions. Furthermore, as noted by Maine Department of Environmental Protection (MEDEP), NOX emissions are already so low as to make any significant additional expenses economically infeasible. So, we shall focus our comments on reducing SO2 emissions by switching to lower sulfur fuels.

SO2 This appears to be the only BART analysis conducted by MEDEP in which cost-effectiveness was not evaluated in terms of annual cost/ton of pollutant removed. Instead, MEDEP appears to have relied solely upon annual cost/deciviews (dv) of visibility improvement. While we encourage the use of the $/dv metric, it was not properly calculated nor applied in this case.

MEDEP also evaluated the BART strategies on the basis of incremental cost/dv. While that is certainly a valid and useful parameter, it must be used with caution and its results placed into the proper perspective. The basic premise underlying the incremental cost analysis is to identify those strategies that contribute relatively little environmental benefit in proportion to their cost. Because, in most cases, the cost of pollution control rises exponentially with control efficiency, the slope of the cost curve will also increase. For this reason, rigid use of incremental cost effectiveness will always result in the choice of the cheapest option if carried to its ultimate extent. (For example, if this approach were used to evaluate PM controls, it is likely that all controls more expensive than a multiple cyclone would be rejected.) According to the NSR Workshop manual, "As a precaution, the difference in incremental costs among dominant alternatives cannot be used by itself to argue one dominant alternative is preferred to another." Instead, it should be used to compare closely performing options.[7]

However, FPL did evaluate the costs and benefits of several SO2 reduction options, including the use of lower sulfur fuels. In doing so, FPL included estimates of the annual costs and emission reductions for each option, as well as the cost/ton for each of those options; those results are contained in Tables 5-3 thru 5-5 of the FPL BART analysis. We used the data from FPL's Table 5-3 to generate the cost-benefit data, and have summarized our results below. We will provide an electronic Excel workbook containing that data under e-mail to MEDEP staff.

[7] BART Guidelines: "You should consider the incremental cost effectiveness in combination with the average cost effectiveness when considering whether to eliminate a control option" and "You should exercise caution not to misuse these [average and incremental cost effectiveness] techniques...[but consider them in situations where an

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option shows]…slightly greater emission reductions…"

Wyman #3 (2007 -2008)

| Fuel Sulfur (%) | 1 | 0.7 | 0.5 | 0.3 |
|---|---|---|---|---|
| Increased Annual Fuel Cost | $ 175,306 | $ 206,243 | $ 835,283 | $ 1,722,127 |
| SO2 Emission Reductions (tpy) | 270 | 351 | 405 | 459 |
| SO2 Reductions Cost-Effectiveness ($/ton) | $ 650 | $ 588 | $ 2,064 | $ 3,755 |
| Greatest Visibility Improvement (dv) | 0.99 | 1.43 | 1.78 | 2.15 |
| Cost-Effectiveness ($/dv) | $ 177,077 | $ 144,226 | $ 469,260 | $ 800,989 |

| | | | 0.5 | 0.3 |
|---|---|---|---|---|
| Increased Annual Fuel Cost | | | $ 2,910,880 | $ 7,014,743 |
| SO2 Emission Reductions (tpy) | | | 250 | 499 |
| SO2 Reductions Cost-Effectiveness ($/ton) | | | $ 11,656 | $ 14,045 |
| Greatest Visibility Improvement (dv) | | | 0.41 | 0.84 |
| Cost-Effectiveness ($/dv) | | | $ 7,099,707 | $ 8,350,885 |

Wyman #4 (2007 -2008)

Our results differ from those presented by MEDEP because we used the most-recent (2007 – 2008) average fuel use data provided by FPL instead of the maximum two-year average. We did this because the most-recent two years are much more representative of anticipated reduced operation of these units. While use of the reduced-capacity operation data did not affect the $/ton estimate (which MEDEP did not include), it has a great effect on the $/dv estimate because of the reduced annual costs.

Our results indicate that, on a $/ton basis, use of 0.7% sulfur oil is the most cost-effective. However, BART is not necessarily the most cost-effective solution. Instead, the $2,000/ton cost of switching Unit #3 to 0.5 % sulfur oil would be considered reasonable by most states.

As noted above, MEDEP appears to have relied solely upon $/dv of visibility improvement. However, the baseline for estimating the increased costs of lower sulfur fuels (2% sulfur) is different from the baseline for existing visibility impacts (1.6% S). Therefore, the visibility benefits are underestimated because the baseline impacts are underestimated. MEDEP has also presented 98$^{th}$ percentile visibility values despite using only one year of meteorological data— that is misleading because, when only one year is modeled, only the maximum values are to be used.

Because BART is a visibility improvement program, we believe that cost/deciview ($/dv) is a very important parameter. In this case, for the six Class I areas evaluated by FPL,

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lower-sulfur (0.5% -0.3% S) fuels would improve visibility by a total of 6.9 – 9.7 dv. This results in a cost-effectiveness value of $0.2 – 2.1 million/dv, which is relatively inexpensive compared to the average $13 -$20 million/dv that we are seeing accepted by states and sources that are proposing reductions under BART. Even if one considers only the visibility improvement at Acadia National Park, the lower-sulfur fuels result in cost-effectiveness values of $0.5 – 8.4 million/dv. This leads to the conclusion that 0.5% - 0.3% sulfur fuels are BART for the FPL boilers.

**ATTACHMENT 3 To NPS/FWS Comments -Maine Draft Regional Haze SIP NPS**

**Comments Regarding SAPPI SD Warren Paper Mill BART Evaluation July 20, 2010**

Page 63 of the 2/06/09 draft of Maine Department of Environmental Protection (MEDEP) RH SIP contains Table 8-2 titled "Modeled Impacts...of Maine BART-Eligible Sources..." That table shows a 0.75 dv impact at Acadia and 0.78 dv at Moosehorn from Power Boiler #1 at the SAPPI SD Warren Paper mill.

The September 2009 company BART report did not evaluate Power Boiler #1.

The MEDEP BART analysis (1/21/10) listed Power Boiler #1 as a BART source and included a BART determination for it.

The MEDEP BART analysis (posted 6/29/10) did not mention Power Boiler #1.

Why was Power Boiler #1 omitted from the BART determination?